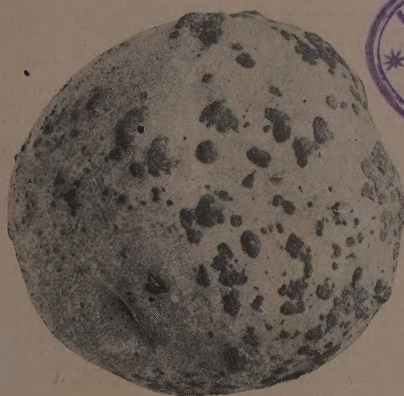
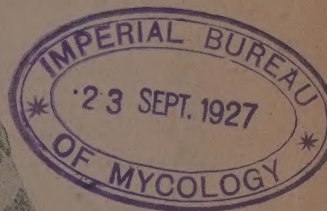


UNIVERSITY OF WYOMING
AGRICULTURAL
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Potato Infected with Rhizoctonia



A Study of Potato Seed Treatment
for Rhizoctonia Control

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A Study of Potato Seed Treatment for *Rhizoctonia* Control^{*†}

BY

H. G. MacMillan, Pathologist, Bureau of Plant Industry, U. S. D. A., and Axell Christensen, Superintendent, Goshen County Experiment Farm.

INTRODUCTION

The *Rhizoctonia* disease of the potato (*Solanum tuberosum*), caused by the fungus *Rhizoctonia solani* (Kühn) is the most common fungus disease of the potato in Wyoming. An experiment for the control of this disease by potato seed treatment was begun at the Goshen County Experiment Farm in 1921. While potato seed treatment is widely recommended and often appears efficacious, some potato-growing sections have abandoned it and in others it appears non-effective. On the contrary, there are those sections where success has been developed and depends on seed treatment. The need and value of treatment should be determined locally, and it was to this end that the single experiment here reported was undertaken.

Potatoes are not extensively grown in Wyoming. The largest recorded acreage for the state, 22,000 acres in 1922, fell off to 14,000 acres in 1925.†

The main crop production is in the irrigated districts of Goshen and Park Counties, and non-irrigated seed potato production largely in Campbell, Laramie and Niobrara Counties. For the state the average production for the five-year period 1921-1925 was ten bushels less per acre than for a like period thirty years earlier. The average yield is being lowered by increases in the dry-land acreage. Potato diseases are also taking an indeterminate toll each year.

^{*}Division of State Farms Bulletin No. 11.

State Farms—Cheyenne, Laramie County; Eden, Sweetwater County; Gillette, Campbell County; Grover, Lincoln County; Lander, Fremont County; Lyman, Uinta County; Sheridan, Sheridan County; Torrington, Goshen County; Worland, Washakie County. (Cheyenne and Sheridan Farms cooperating with U. S. D. A.)

[†]This study was made at the Goshen County Experiment Farm, Torrington, Wyoming, by the Division of State Experiment Farms, in cooperation with the Office of Vegetable and Forage Diseases, Bureau of Plant Industry, United States Department of Agriculture.

†Wyo. Agri. Statistics Bul. 3, 1925.

CLIMATE AND OCCURRENCE

The climate of Wyoming is agreeable to potato growing. The potato is a cool-weather crop. Smith* reports the greatest yields in states with a mean annual temperature below 45° F. and that of the warmest month not far from 65° F.

The mean annual temperature of Wyoming is 41.7° F. and that of July, the warmest month, 65.5° F. While these conditions are excellent for the development of the potato, they also favor the destructive activity of the *Rhizoctonia* fungus. As has been pointed out by Richards,† this fungus operates most vigorously as a parasite under such temperature as best favors maximum potato production.

All of the common western potato diseases are to be found on Wyoming potatoes. The severity of the diseases varies with the conditions under which the potatoes are grown. A brief survey in the Torrington district prior to 1921, showed *Rhizoctonia solani* (Kühn) to be prevalent. For the state the decrease caused by *Rhizoctonia* is a decided economic loss. It was "reported in 1903 and frequently since then. General and often very severe."‡ During the years 1921-1925, inclusive, no potato diseases of consequence were reported from Wyoming. However, *Rhizoctonia* continued to be general, and sometimes severe.

THE RHIZOCTONIA DISEASE

The *Rhizoctonia* fungus may develop from two sources: from the soil, and from the sclerotia or resting bodies on the seed potatoes. The fungus carried in the seed potatoes is usually the cause of most of this disease found under Wyoming conditions. The resting bodies are brown or blackish masses of irregular shape and size, usually hard, but sometimes felt-like, that are found closely adhering to the skin of the seed potato. When the seed is planted the resting bodies send out mycelium or threads of the fungus. These attack and commonly kill the growing point of the young sprouts. If the sprouts develop into stems they frequently become spotted with large brown patches which soon girdle the

*Smith, W. I. Monthly Weather Review, May, 1915, p. 222-223.

†Richards, B. L. Jour. Agr. Res. Vol. 23, pp. 761-770. 1923.

‡The Plant Disease Bulletin, Vol. 2, No. 14, p. 246, Nov., 1918.

stem, corroding the surface deeply and killing it. *Rhizoctonia* is not the only cause of black or brown underground stem lesions but in Wyoming is the most common one. More sprouts may emerge from the eyes of the seed piece, to be killed in turn. It is in the death of sprouts and stems that the *Rhizoctonia* is most destructive. It is in the prevention of this damage that seed treatment is the most effective. The continuous sprouting of the seed piece, as effective as though done by hand, results in a devitalized plant. On plants which become established, and which show no superficial evidence of this disease, the mycelium of the fungus can usually be found. It may appear merely as a brown net or web covering the white tissue of the underground stem. More severely it appears in cankers corroding the stem, dark brown in color. As the season advances and becomes cooler, the temperature may descend to the point where the fungus again becomes active and destructive to the potato tissue. The stolons are corroded and the new tubers cut off. The small rootlets are killed, and the plant thereby increasingly hindered in its ability to obtain water.

The symptoms commonly ascribed to this disease then begin to appear: A gradual cessation of the growth of the plant; a lack of softness in the leaves, which tend to fold along the midrib; an increasing failure to develop new leaves; and the development of a purplish-red color along the edges of the leaves. Because the stolons have been killed, the food materials in the plant cannot be transferred to the new tubers. As a result, numerous small tubers form close to the main stem just under or at the surface of the ground, to absorb and store the food manufactured by the plant. Frequently small green tubers develop in the leaf axils in the lower part of the vine. At harvest the yield is small from fields of potatoes showing much of this disease. *Rhizoctonia* appears to thrive best in acid soils.

Except for a suitable seed treatment no control measure is efficacious in the prevention of the *Rhizoctonia* disease. If preventive measures fail, no artificial cure can be applied. At the time this work was initiated a seed treatment with mercuric chlo-

ride was the most effective known. A number of factors affect both the efficacy of the treatment and the promotion of the disease during the growing season. Both are usually evidenced in the yields. As the acreage and effort which could be devoted to this experiment were strictly limited, the investigation centered on but few points. These were problems most frequently confronting the practical grower.

The following study was undertaken to determine if—

- (1) A mercuric chloride potato seed treatment was effective in the control of *Rhizoctonia*.
- (2) If early and late maturing potatoes were equally benefited by treatment.
- (3) If early irrigation as compared with normal irrigation intensified the disease.
- (4) If the amount of fungus on the seed potatoes altered the efficacy of the treatment, in that large sclerotia would fail to be killed by the treatment given; and,
- (5) If treatment from the standpoint of yield was commercially worth while.

THE SOIL

The soil on which the potatoes were planted for the duration of this experiment was practically uniform. It was a light sandy loam, deep, with good drainage. Invariably the crop of the previous year was alfalfa. In preparation the alfalfa was crowned the preceding fall, the land plowed to a depth of nine inches in the spring, disked, harrowed and floated.

THE SEED POTATOES

Two varieties of potatoes were used in the experiment, the Bliss Triumph, an early maturing variety; and King, a late maturing variety. Both varieties were extensively grown in Wyoming. The source of the seed was not always the same, but each year's

supply was uniform, well kept, and well infected with *Rhizoctonia*. For the purposes of the experiment the seed was sorted into two lots, one designated as "lightly infected", and consisting of tubers with no, few, and small sclerotia. The second lot, known as the "heavily infected", consisted of tubers carrying large and numerous sclerotia—while the heaviest infected of the first lot, were but a degree removed from the lightest infected of the second lot, as groups they were definitely separable by the amounts of *Rhizoctonia* which each carried. Only one treatment was used throughout the entire series. Four ounces of mercuric chloride were dissolved in 30 gallons of water in a barrel. This at the customary ratio of one part salt to 1000 parts water. The 30-gallon solution was used to treat four sacks of potatoes, the first sack being immersed for one hour, the second for one hour and fifteen minutes, the third for one hour and thirty minutes, and the fourth for one hour and forty-five minutes. For the purposes of this experiment, it was assumed that each sack treated received a like exposure to the action of the chemical; that a fifteen minute longer exposure for each succeeding sack placed in the solution compensated for the weakening of the solution by the preceding sack. On being taken from the solution, the sacks were drained, and the tubers spread out to dry. They were then cut into seed pieces, as uniformly as possible, and planted. The control lots were merely dipped in water, dried, cut, and planted. In planting a two-man planter was used to assure that each hill received a seed piece.

CULTURE

Ten rows were planted for each lot in an experiment, and amounted to one-tenth of an acre. After planting, the rows were cultivated deeply and harrowed down. They were ditched at the proper time. The early irrigated lots were watered two weeks prior to the normally irrigated lots, followed by a second irrigation in one week. Beginning at the time of normal irrigation all lots received the same amount of water for the remainder of a season. The amount of water applied and the duration of the application for every watering were such as would be considered normal for

the land in use. Seven or eight irrigations usually were given the early irrigated lots, and five or six to the normally irrigated lots. When a heavy rain fell at the time an irrigation was due, as occurred once in 1922 and once in 1925, no irrigation was given. Irrigations ceased about the first week in September, and digging occurred about the first week in October. The yields are quoted in bushels per acre, each bushel containing the usual weight of sixty pounds. The experimental data are given in tabular form.

Table 1 gives the entire data for the year 1921; Table 2, for 1922; Table 3, for 1923; Table 4, for 1924; and Table 5 for 1925. Table 6 gives the yield data for the entire experiment, with averages and percentages.

TABLE I.

SHOWS THE VARIETY OF POTATO; KIND OF RHIZOCTONIA INFECTION; NUMBER OF IRRIGATIONS, WITH DATE OF FIRST; DATES OF PLANTING AND HARVESTING; AND YIELDS IN BUSHELS PER ACRE FOR THE TREATED AND NON-TREATED LOTS, FOR THE SEASON OF 1921.

Potato Variety	Rhizoctonia Infection	Irrigations		Dates of		Yield in Bushels per A.	
		No. of	Date of 1st	Planting	Harvesting	Treated	Non-Treated
Triumph	Light	8	July 25	May 26	Oct. 3	353.3	253.3
"	"	6	Aug. 5	" "	" "	371.6	310.0
"	Heavy	8	July 25	" "	" "	318.3	153.3
"	"	6	Aug. 5	" "	" "	390.0	248.3
King	Light	8	July 25	May 27	Oct. 4	245.0	178.3
"	"	6	Aug. 5	" "	" "	266.6	165.0
"	Heavy	8	July 25	" "	" "	273.3	240.0
"	"	6	Aug. 5	" "	" "	315.0	255.0

TABLE II.

SHOWS THE VARIETY OF POTATO; KIND OF RHIZOCTONIA INFECTION; NUMBER OF IRRIGATIONS, WITH DATE OF FIRST; DATES OF PLANTING AND HARVESTING; AND YIELDS IN BUSHELS PER ACRE FOR THE TREATED AND NON-TREATED LOTS, FOR THE SEASON OF 1922.

Potato Variety	Rhizoctonia Infection	Irrigations		Dates of		Yield in Bushels per A.	
		No. of	Date of 1st	Planting	Harvesting	Treated	Non-Treated
Triumph	Light	7	July 13	May 19	Oct. 7	320.0	317.8
"	"	4	Aug. 8	" "	" "	262.1	251.8
"	Heavy	7	July 13	" "	" "	281.6	270.1
"	"	4	Aug. 8	" "	" "	243.5	202.6
King	Light	9	July 13	" "	" "	176.1	152.8
"	"	6	Aug. 8	" "	" "	104.0	59.5
"	Heavy	9	July 13	" "	" "	205.0	149.3
"	"	6	Aug. 8	" "	" "	80.0	53.3

TABLE III.

SHOWS THE VARIETY OF POTATO; KIND OF RHIZOCTONIA INFECTION; NUMBER OF IRRIGATIONS, WITH DATE OF FIRST; DATES OF PLANTING AND HARVESTING; AND YIELDS IN BUSHELS PER ACRE FOR THE TREATED AND NON-TREATED LOTS, FOR THE SEASON OF 1923.

Potato Variety	Rhizoctonia Infection	Irrigations		Dates of		Yield in Bushels per A.	
		No. of	Date of 1st	Planting	Harvesting	Treated	Non-Treated
Triumph	Light	8	July 11	May 25	Oct. 9	95.3	85.8
"	"	6	Aug. 3	" "	" "	105.8	117.5
"	Heavy	8	July 11	" "	" "	115.8	92.5
"	"	6	Aug. 3	" "	" "	111.6	84.1
King	Light	8	July 11	" "	Oct. 11	19.1	18.6
"	"	6	Aug. 3	" "	" "	23.3	15.3
"	Heavy	8	July 11	" "	" "	18.3	11.1
"	"	6	Aug. 3	" "	" "	22.5	15.8

NOTE: The vines of all lots, but more especially the Kings, suffered severely from the early blight, caused by *Alternaria solani*.

TABLE IV.

SHOWS THE VARIETY OF POTATO; KIND OF RHIZOCTONIA INFECTION; NUMBER OF IRRIGATIONS, WITH DATE OF FIRST; DATES OF PLANTING AND HARVESTING; AND YIELDS IN BUSHELS PER ACRE FOR THE TREATED AND NON-TREATED LOTS, FOR THE SEASON OF 1924.

Potato Variety	Rhizoctonia Infection	Irrigations		Dates of		Yield in Bushels per A.	
		No. of	Date of 1st	Planting	Harvesting	Treated	Non-Treated
Triumph	Light	9	July 21	June 4	Oct. 7	155.0	155.0
"	"	7	Aug. 4	" "	" "	198.3	210.0
"	Heavy	9	July 21	" "	" "	178.3	153.3
"	"	7	Aug. 4	" "	" "	178.3	166.6
King	Light	9	July 21	" "	Oct. 9	198.3	156.6
"	"	7	Aug. 4	" "	" "	201.6	216.6
"	Heavy	9	July 21	" "	" "	133.3	95.0
"	"	7	Aug. 4	" "	" "	118.3	120.0

TABLE V.

SHOWS THE VARIETY OF POTATO; KIND OF RHIZOCTONIA INFECTION; NUMBER OF IRRIGATIONS, WITH DATE OF FIRST; DATES OF PLANTING AND HARVESTING; AND YIELDS IN BUSHELS PER ACRE FOR THE TREATED AND NON-TREATED LOTS, FOR THE SEASON OF 1925.

Potato Variety	Rhizoctonia Infection	Irrigations		Dates of		Yield in Bushels per A.	
		No. of	Date of 1st	Planting	Harvesting	Treated	Non-Treated
Triumph	Light	8	July 16	June 8	Oct. 3	286.6	171.6
"	"	6	Aug. 4	" "	" "	301.6	335.8
"	Heavy	8	July 16	" "	" "	272.5	256.6
"	"	6	Aug. 4	" "	" "	249.1	226.6
King	Light	8	July 16	" "	Oct. 5	274.1	262.5
"	"	6	Aug. 4	" "	" "	314.1	249.1
"	Heavy	8	July 16	" "	" "	235.8	262.5
"	"	6	Aug. 4	" "	" "	178.6	200.8

TABLE VI.

Shows the yield in bushels per acre for the treated and non-treated lots of Triumph and King varieties, each with light infection, early and normal irrigation, and heavy infection, early and normal irrigation, with the difference in bushels between the treated and non-treated lots of each kind, and the difference as per cent, the gain in a treated lot being regarded as positive (+), and a loss in a treated lot being regarded as negative (-), using the non-treated yield of the series as the standard. It shows, also, averages for normal and early irrigations, in both the light and heavy infections, with both Triumph and King varieties, as well as averages for all Triumph and all King lots, together with the yield difference in bushels and in per cent.

	1921				1922			
	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Difference per cent of non-treated	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Yield per cent of non-treated
Triumph, light infection, early irrigation	353.3	253.3	100.0	+ 39.4	320.0	317.8	2.2	+ 0.6
Triumph, light infection, normal irrigation	371.6	310.0	61.6	+ 19.8	262.1	251.8	10.3	+ 4.0
Triumph, average for light infection	362.4	281.6	80.8	+ 28.7	291.0	284.8	6.2	+ 2.1
Triumph, heavy infection, early irrigation	318.3	153.3	165.0	+107.6	281.6	270.1	11.5	+ 4.2
Triumph, heavy infection, normal irrigation	380.0	248.3	131.7	+ 53.0	243.5	202.6	40.9	+20.1
Triumph, average for heavy infection	349.1	200.8	148.3	+ 70.6	262.5	236.3	26.2	+11.0
Triumph, average for all	355.7	241.2	114.5	+ 47.4	276.7	260.5	16.2	+ 6.2
King, light infection, early irrigation	245.0	178.3	66.7	+ 37.9	176.1	152.8	23.3	+15.2
King, light infection, normal irrigation	266.6	165.0	101.6	+ 60.9	104.0	59.5	44.5	+74.6
King, average for light infection	250.8	170.6	80.2	+ 47.0	140.0	106.1	33.9	+31.9
King, heavy infection, early irrigation	273.3	240.0	33.3	+ 13.8	205.0	149.3	55.7	+37.3
King, heavy infection, normal irrigation	315.0	255.0	60.0	+ 23.5	80.0	53.3	26.7	+50.0
King, average for heavy infection	294.1	247.5	46.6	+ 18.8	142.5	101.3	41.2	+40.7
King, average for all	272.4	209.0	63.4	+ 30.3	141.2	103.7	37.5	+36.1
	1923				1924			
	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Difference per cent of non-treated	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Yield per cent of non-treated
Triumph, light infection, early irrigation	95.3	85.8	9.5	+ 11.1	155.0	155.0	0	00.0
Triumph, light infection, normal irrigation	105.8	117.5	11.7	- 9.9	198.3	210.0	11.7	- 5.5
Triumph, average for light infection	100.5	101.6	1.1	- 1.0	176.6	182.5	5.9	- 3.2
Triumph, heavy infection, early irrigation	115.8	92.5	23.3	+ 25.1	178.3	158.3	20.0	+12.6
Triumph, heavy infection, normal irrigation	111.6	84.1	27.5	+ 32.7	178.3	166.6	11.7	+ 7.0
Triumph, average for heavy infection	113.7	88.3	25.4	+ 28.7	178.3	162.4	15.9	+ 9.7
Triumph, average for all	107.1	94.9	12.2	+ 12.8	177.4	172.4	5.0	+ 2.9
King, light infection, early irrigation	19.1	18.6	0.5	+ 2.6	198.3	156.6	41.7	+26.5
King, light infection, normal irrigation	23.3	15.3	8.0	+ 52.2	201.6	216.6	15.0	- 6.9
King, average for light infection	21.2	16.9	4.3	+ 25.4	199.9	186.6	13.3	+ 7.1
King, heavy infection, early irrigation	18.3	11.1	7.2	+ 39.3	133.3	95.0	38.3	+40.3
King, heavy infection, normal irrigation	22.5	15.8	6.7	+ 42.4	118.3	120.0	1.7	- 1.4
King, average for heavy infection	20.4	13.4	7.0	+ 52.2	125.8	107.5	22.3	+20.7
King, average for all	20.8	15.1	5.7	+ 37.7	159.9	147.0	12.9	+ 8.7

	1925				Average Totals			
	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Difference per cent of non-treated	Yield treated bushels	Yield non-treated bushels	Yield difference bushels	Yield per cent of non-treated
Triumph, light infection, early irrigation	286.6	171.6	115.0	+ 67.0	242.0	196.7	45.3	+23.0
Triumph, light infection, normal irrigation	301.6	335.8	34.2	- 10.1	247.8	245.0	2.8	+ 1.1
Triumph, average for light infection	299.1	258.7	40.4	+ 15.6	244.9	220.8	24.1	+10.9
Triumph, heavy infection, early irrigation	272.5	256.6	15.9	+ 6.1	233.3	186.1	47.2	+25.3
Triumph, heavy infection, normal irrigation	249.1	226.0	22.5	+ 9.9	232.5	185.6	46.9	+25.2
Triumph, average for heavy infection	260.8	241.6	19.2	+ 7.9	232.9	185.8	47.1	+25.3
Triumph, average for all	282.9	250.1	32.8	+ 13.1	238.9	203.3	35.6	+17.5
King, light infection, early irrigation	274.1	262.5	11.6	+ 4.4	182.5	153.7	28.8	+18.7
King, light infection, normal irrigation	314.1	249.1	65.0	+ 26.0	181.9	141.1	40.8	+28.9
King, average for light infection	294.1	255.8	38.3	+ 14.9	182.2	147.4	34.8	+23.6
King, heavy infection, early irrigation	235.8	282.5	46.7	- 16.5	173.1	155.8	17.3	+11.1
King, heavy infection, normal irrigation	176.6	200.8	24.2	- 12.0	142.5	129.0	13.5	+10.4
King, average for heavy infection	206.2	241.6	35.4	- 14.6	157.8	142.4	15.4	+10.8
King, average for all	250.1	248.7	1.4	+ 0.5	170.0	144.9	25.1	+17.3

DISCUSSION

It is to be expected that the effect of the treatment will be revealed in the comparative yield data. From a study of Tables 1 to 5, inclusive, it is apparent that other factors may be at work. The results for the year 1923 were greatly impaired by the early blight, *Alternaria solani*, which practically ruined the foliage, and reduced the yield to practically nothing.

In 1921 and 1922 the dates of planting were earlier than in 1924 and 1925, while the number of irrigations averaged less for the earlier two years, the dates of harvest for all four years are practically the same. The yields of Triumphs are greater for the first two years, as compared with the last two years, whereas the Kings show a much less difference. It is possible that a longer growing season has resulted in a greater yield for the Triumphs.

Table 6 shows that in 1921 and 1922 all treated lots showed an increase in yield over the non-treated, and that in the other

three years there were only seven instances of non-treated lots yielding more than treated lots. However, the difference in favor of non-treatment in these cases, either in actual yield or in per cent, is small.

While the data for the individual years show many interesting points of comparison, both in actual yearly performances and in groups. The data bearing on the points which it was desired to determine are found almost entirely in the average totals of Table 6.

Unfortunately, tubers entirely free from *Rhizoctonia* are not easily obtained, and could not be used in this experiment. It would appear that treatment with mercuric chloride was generally effective in the five-year period, in that treated seed tubers yielded consistently more than non-treated seed.

In a comparison of the treatment between the early maturing and late maturing variety, there appear wide individual differences in the several years' data, but the average total shows that 'Triumph' had a positive increase of 17.5 per cent in favor of treatment, and the King a positive increase of 17.3 per cent. While this is a surprising similarity in per cent, the increase in the actual yield figures show a large difference in favor of the Triumph. It is apparent that the early and late variety benefited about equally from the treatment.

There appears to have been no consistent benefit derived from the early irrigation, as compared with the normal irrigation. The 'Triumphs' with light infection did not yield as well with early water as with normal water, the Triumphs with heavy infection showing like yields in the treated and non-treated lots, between the early and normal irrigations. The King variety, however, shows an increased yield with the use of early irrigation. The larger increases appear between the early and normal irrigations of the light and heavy infection lots of the untreated seed, indicating that early water was here of advantage. There is a possibility that the mere physical application of the water, in supplying more moisture accounts for the increased yield, rather than any deleterious effect of early irrigation on the *Rhizoctonia*.

A significant difference appears between the performance of the light and heavy infection lots of seed in both the Triumph and King varieties. There is a gain of only 10.9 per cent in favor of treatment in an average for Triumphs with light infection, while the yields in both the treated and non-treated lots were large. There is a gain of 25.3 per cent in favor of treatment with the heavily infected Triumphs, while the actual yields are not as high comparatively as with the light infection lots. With the King variety, the light infection shows the greatest per cent gain from treatment, 23.6 per cent, and only 10.8 per cent for the heavy infection; but the actual yield figure shows a much greater advantage for the lightly infected seed, both in the treated and non-treated lots.

The question of commercial gain as a result of treatment is one answered fully only by taking into account data and cost figures not available in this bulletin. The gain in yield due to treatment is best seen in the average total, difference in bushels column, which shows that an average of all treatments for the Triumph variety made a gain of 35.6 bushels, and for the King a gain of 25.1 bushels. It would appear from these figures that the treatment paid.

CONCLUSIONS

1. Mercuric chloride seed potato treatment is effective in the control of the *Rhizoctonia* disease of the potato, in that it increases the yield of all lots in this experiment.

2. Early and late maturing varieties, as indicated by the performance of the Bliss Triumph and King varieties, appear to be equally benefited by seed treatment.

3. Early irrigation, as compared with late irrigation, appears to have no effect on the severity of the disease.

4. A lesser amount of *Rhizoctonia* on the seed potato, whether treated or not, lessens the severity of the disease.

5. The treatment with mercuric chloride for the control of the *Rhizoctonia* disease appears to be commercially worth while.

